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Promoting transparency and reproducibility in *Behavioral Neuroscience*: Publishing Replications, Registered Reports, and Null Results

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Abstract

The editors of *Behavioral Neuroscience* have been discussing several recent developments in the landscape of scientific publishing. The discussion was prompted, in part, by reported issues of reproducibility and concerns about the integrity of the scientific literature. Although enhanced rigor and transparency in science are certainly important, a related issue is that increased competition and focus on novel findings has impeded the extent to which the scientific process is cumulative. We have decided to join the growing number of journals that are adopting new reviewing and publishing practices to address these problems. In addition to our standard Research Articles, we are pleased to announce three new categories of articles: Replications, Registered Reports, and Null Results. In joining other journals in psychology and related fields to offer these publication types, we hope to promote higher standards of methodological rigor in our science. This will ensure that our discoveries are based on sound evidence and that they provide a durable foundation for future progress.

Keywords

p-hacking; HARKing; negative results; publication bias; scientific method

Recent developments in the landscape of scientific publishing have been a subject of discussion among the editors of *Behavioral Neuroscience* over the past several years. Concerns about the integrity of the scientific literature have shaken confidence in the progress of discovery across many fields, with psychology undergoing particular scrutiny from both within and without. For example, failed replications of “textbook” phenomena have drawn attention to methodological shortcomings that may be uncomfortably common, including inadequate statistical power (Button et al., 2013), “p-hacking” where repeated hypothesis testing is carried out until statistical significance can be uncovered (Head, Holman, Lanfear, Kahn, & Jennions, 2015), and “HARKing” (hypothesizing after the results are known) where findings from already-collected data are framed as if they were a priori

hypotheses formulated before the experiment was carried out (Kerr, 1998). The seriousness of methodological issues in biological and psychological sciences is reflected in the recent NIH mandate to specifically address rigor and transparency in applications for funding.

We have decided to join the growing number of journals that are adopting new reviewing and publishing practices in order to partially address these problems. Currently, we publish research articles that report original research and, occasionally, reviews of the literature. These articles can be published in the default long format or, if appropriate, in a short “Brief Communication” format. In addition to our standard Research Articles, we are pleased to announce three new categories of articles: Registered Reports, Replications, and Null Results. We anticipate that each of these new article types will be published in the long format.

Registered Reports

We will accept submission of articles as Registered Reports (Chambers, 2013; Chambers, Forstmann, & Pruszyński, 2017), which will be reviewed for significance and methodological approach, at a point in time before the study has actually been carried out. A decision of provisional acceptance can then be rendered before the study is actually done, so that publication of the full report does not depend on the outcome of the study. This is meant to encourage formulation of study hypotheses before data are collected, preventing p-hacking and HARKing, as well as scrutiny of power and experimental design at a point in time when these can be adjusted in response to peer review. Moreover, this mode of publication is meant to discourage selective publication of positive or “flashy” results, which may distort the research literature. This is because the decision whether to publish or not is made before the data are obtained, so evaluation of the importance of the article to the field is based on the research question rather than the outcome. Authors will submit a partial article containing hypotheses, rationale for the study, experimental design, and methods. This article will undergo review and potentially revisions. If a Registered Report article is accepted, we expect authors will submit the full research article to Behavioral Neuroscience, where it will receive rapid editorial review for adherence to the preregistered design, and expedited production for full publication in the journal. Accepted articles will be published under the banner, “Registered Report”.

Replications

We encourage researchers to submit articles replicating other findings in the field. These will receive full consideration for publication and, if accepted, will be published under the banner, “Replication.” Replication studies may also be registered, in which case they will be published as a Registered Report. We want to be clear that the quality of the study methodology as well as the importance of the findings to the field will be incorporated into publication decisions. For instance, a replication of a study that has received few citations since its initial publication would be a lower priority than a replication of a study that has been more influential, whether the replication was successful or not. Thus, we encourage researchers undertaking replication attempts to consider submitting Registered Reports,

although we will consider replication studies for publication whether they are preregistered or not.

Null Results

Finally, we encourage researchers to submit articles describing null findings, in which study hypotheses were not confirmed or failed to reach conventional levels of statistical significance. Articles published under “Null Results” will be expected to have the potential for making a positive advance in the literature. Thus an article reporting a null result should address an important issue, employ robust methods and analyses, and exhibit clear, compelling results. In addition, it must be the case that there was some reason to expect a positive result in the first place. Because there are many ways for studies to fail, articles reporting null results must include sufficient methodological information and internal controls to convince reviewers the finding is meaningful and not the result of a technical failure or some other flaw. If a Registered Report or a Replication yields a null result and is accepted for publication, such articles will be published under those banners. Otherwise, an accepted article reporting a null result will be published under the banner, “Null Result”.

Conclusions

We argue that the publication of registered reports, replications, and null results can result in positive advances as well as guard against the important problem of publication bias. Publication bias arises when the outcome of a study influences whether the author decides to publish. Decisions not to publish high quality research because of the direction or strength of the outcome can distort a body of literature and impede the ability to integrate evidence. The quality of the research, however, is key. Thus, for these three new categories of articles, we will consider the quality of the study methodology as well as the importance of the findings to the field when making publication decisions.

In joining other journals in psychology and related fields in offering these publication formats, we hope that we can contribute to the growing movement to promote high standards of methodological rigor in our science, ensuring that our discoveries are based on sound evidence. We welcome feedback from our authors and readers as we develop these new modes of publication, and we continue to look forward to receiving articles describing your exciting work.

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